

**Translation**

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>157-60.759PCT/AP/zi</b>		<b>FOR FURTHER ACTION</b>	See Form PCT/IPEA/416
International application No. <b>PCT/EP2004/004054</b>	International filing date ( <i>day/month/year</i> ) <b>16.04.2004</b>	Priority date ( <i>day/month/year</i> ) <b>16.04.2003</b>	
International Patent Classification (IPC) or national classification and IPC			
Applicant <b>SAUER GMBH</b>			

  

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>16</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>5</u> sheets, as follows:</p> <div style="margin-left: 40px;"> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> </div> <p style="margin-left: 20px;">b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>	<p>4. This report contains indications relating to the following items:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;"><input checked="" type="checkbox"/></td> <td style="width: 20%;">Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>	<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input checked="" type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input checked="" type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. I

Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-12 \_\_\_\_\_ as originally filed/furnished
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the claims:
- nos. \_\_\_\_\_ as originally filed/furnished
- nos.\* 1-25 \_\_\_\_\_ as amended (together with any statement) under Article 19
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☒ the drawings:
- sheets 1/4-4/4 \_\_\_\_\_ as originally filed/furnished
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, nos. \_\_\_\_\_
- ☐ the drawings, sheets/figs \_\_\_\_\_
- ☐ the sequence listing (*specify*): \_\_\_\_\_
- ☐ any table(s) related to sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

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## Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application  
☒ claims Nos. 1a+4, 5-8&17 (where dependent on claim 4), 1a+5, 1a+7, 6 (where dependent on claim 5), 8&17 (where dependent on one of claims 5&7), 1a+17, 18a+25, 18b+25

because:

- ☐ the said international application, or the said claims Nos. \_\_\_\_\_  
relate to the following subject matter which does not require an international preliminary examination (*specify*):

- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. \_\_\_\_\_  
are so unclear that no meaningful opinion could be formed (*specify*):

- ☐ the claims, or said claims Nos. \_\_\_\_\_ are so inadequately supported  
by the description that no meaningful opinion could be formed.

- ☒ no international search report has been established for said claims Nos. 1a+4, 5-8&17; 1a+5, 1a+7, 6; 8&17; 1a+17, 18a+25, 18b+25 (parentheses as above)

- ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

- |                            |  |
|----------------------------|--|
| the written form           | <input type="checkbox"/> has not been furnished            |
|                            | <input type="checkbox"/> does not comply with the standard |
| the computer readable form | <input type="checkbox"/> has not been furnished            |
|                            | <input type="checkbox"/> does not comply with the standard |

- ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.

- ☒ See Supplemental Box for further details.

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Box No. IV Lack of unity of invention

1. ☐ In response to the invitation to restrict or pay additional fees the applicant has:
  - ☐ restricted the claims.
  - ☐ paid additional fees.
  - ☐ paid additional fees under protest.
  - ☐ neither restricted the claims nor paid additional fees.
2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:
  - ☐ complied with.
  - ☒ not complied with for the following reasons:  
  
See Supplemental Box.

4. Consequently, this report has been established in respect of the following parts of the international application:

- ☐ all parts.
- ☒ the parts relating to claims Nos. 1a, 2&3&6&8 (dep on claim 1a), 1b, 2-17 (dep on cl 1b), 4-8&17 (dep on cl 3), 18a, 18b, 19&20 (dep on cl 18a), 21-24 (dep on cl 18b)

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement		
1. Statement			
Novelty (N)	Claims	3 (dependent on 1a), 4-8&17 (dependent on 3), 1b, 18b, 2-17 (dependent on 1b), 19&20&23 (dep on 18b)	YES
	Claims	1a, 2 (dep 1a), 18a, 19&20 (dep 18a) 18b, 21&22&24 (dep 18b)	NO
Inventive step (IS)	Claims	3 (where dependent on 1a), 4-8&17 (dependent on 3)	YES
	Claims	1a, 1b, 2, 4-17 (dep 1b), 18a, 18b, 19, 20, 21-24 (dep 18b)	NO
Industrial applicability (IA)	Claims	1a, 1b, 2, 3, 4-8 (dependent on 3), 4-17 (dependent on 1b), 18a, 18b, 19, 20, 21-24 (dependent on 18b)	YES
	Claims		NO
2. Citations and explanations (Rule 70.7)			
<p>0. Pursuant to the requirements of PCT Rule 66.1e), an examination is not carried out for claims for which a search report was not established.</p> <p>1. The present report refers to the following documents:</p> <p>D1: DE 39 23 356 C (MAHO AG) 7 February 1991 (1991-02-07)</p> <p>D2: EP 0 407 969 A (MAHO AG) 16 January 1991 (1991-01-16)</p> <p>D3: US 5 782 253 A (HOGERWERL JOHN D ET AL) 21 July 1998 (1998-07-21)</p> <p>D4: JP 4 237553 A</p> <p style="text-align: center;"><i>Invention 1</i></p> <p>2. INDEPENDENT CLAIMS 1a and 18a</p> <p>1. The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claims 1a and 18a is not novel (PCT Article 33(2)).</p>			

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Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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Claim 1a: See above, Box IV, 5.

Claim 18a: D1 discloses (the references in parentheses relate to said document):

A device for producing a cavity, in particular for carrying out the method according to one or more of the previous claims, with a laser-processing device and a control device for the laser-processing device (see column 3, lines 12-20), wherein the control device is designed to control the laser-processing device.

3. DEPENDENT CLAIMS 2, 6, 8, 19, 20

1. The above claims do not contain any features which, in combination with the features of any claim to which they refer, meet the PCT novelty requirements.

4. DEPENDENT CLAIM 3

The combination of features contained in the dependent claim is neither known nor obvious from the available prior art.

The reasons for this are as follows:

D1, which is considered the closest prior art, discloses a method from which the subject matter of claim 3 differs in that the "side walls are processed after a plurality of layers has been removed". Consequently, the subject matter of claim 1 is novel (PCT Article 33(2)).

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Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

This measure, which enables smoothness to be achieved between the layers that are removed, is not obvious from the prior art cited in the international search report. The subject matter of claim 1 of the present application is therefore inventive (PCT Article 33(3)).

Claims 4-8 are dependent on claim 3 and therefore likewise meet the PCT novelty and inventive step requirements.

*Invention 4*

5. INDEPENDENT CLAIM 1b

1. The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claim 1b within the meaning of PCT Article 33(2) does not involve an inventive step (PCT Article 33(3)).

D1 discloses (the references in parentheses relate to said document):

Method for producing a cavity (see column 1, line 10) in a workpiece, in which a laser beam is used to remove material (see claim 1), wherein the side walls of the cavity are processed using a laser beam (see column 2, lines 9-15, column 4, lines 8-17).

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Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

The subject matter of claim 1b differs therefore from the known method(s) in that

the side walls of the cavity are processed using a processing means.

The problem addressed by the present invention can therefore be considered that of

achieving deposit-free side walls.

With respect to the feature "processed using processing means (in this case, air is used as a processing means)", D4 describes the same advantages as the present application. A person skilled in the art would therefore consider the inclusion of this feature in the method described in D1 to be a standard measure for solving the problem of interest.

6. INDEPENDENT CLAIM 18b

1. The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claim 18 is not novel (PCT Article 33(2)).

D3 discloses (the references in parentheses relate to said document):

A device for producing a cavity, in particular for carrying out the method according to one or more



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Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

of the preceding claims, with a laser processing device (see column 2, lines 17-19 in conjunction with column 4, lines 35, 36) and a control device for the laser-processing device (see figure 7), wherein the control device is designed to control a supply device for processing the side wall of the cavity.

7. DEPENDENT CLAIMS 2-17 (insofar as they are dependent on claim 1b), 19-24 (insofar as they are dependent on claim 18b)

1. The above claims do not contain any features which, in combination with the features of any claim to which they refer, meet the PCT novelty and inventive step requirements.

## Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Boxes III and IV

Box III:

The search report was restricted to inventions 1 and 4.

Box IV:

The different inventions/groups of inventions are:

INVENTION 1: 1a, 2 & 3 & 6 & 8 (insofar as dependent on claim 1a), 4-8 (insofar as dependent on claim 3), 17 (insofar as dependent on claim 3), 18a, 19 & 20 (insofar as dependent on claim 18a)

Method for processing the side walls of laser-produced cavities, wherein the side walls are processed using a laser beam after a plurality of layers have been removed.

INVENTION 2: 1a+4, 5-8 (insofar as dependent on claim 4), 17 (insofar as dependent on claim 4)

Processing of the side walls of laser-produced cavities, the side walls being processed with specially adapted laser radiation.

INVENTION 3: 1a+5, 1a+7, 6 (insofar as dependent on claim 5), 8 (insofar as dependent on one of claims 5 and 7), 17 (insofar as dependent on one of claims 5 and 7)

## Supplemental Box

Processing of the side walls of laser-produced cavities, the side walls being processed according to data pertaining to the cavities.

INVENTION 4: 1b, 2-17 (insofar as dependent on claim 1b), 18b, 19-24 (insofar as dependent on claim 18b)

Processing of the side walls of laser-produced cavities, the side walls being processed with a processing means.

INVENTION 5: 1a+17, 18a+25, 18b+25

Processing of the side walls of laser-produced cavities, the side walls of the cavity being processed using ultrasound.

For the following reasons these inventions/groups are not so linked as to form a single general inventive concept (PCT Rule 13.1):

Reasons:

Owing to the use of the words "and/or", claims 1 and 18 can be read in different ways (cf. PCT Rule 13.3).

A first reading of claim 1 relates to:

Claim 1a: method for processing the side walls of laser-produced cavities, wherein the side walls are processed using a laser beam.

A second reading of claim 1 relates to:

## Supplemental Box

Claim 1b: method for processing the side walls of laser-produced cavities, wherein the side walls are processed using a processing means (or using a laser beam and a processing means).

A first reading of claim 18 relates to:

Claim 18a: device...with a laser processing device and a control device for the laser-processing device, characterised in that the control device is designed to control the laser-processing device...

A second reading of claim 18 relates to:

Claim 18b: device...with a laser-processing device and a control device for the laser-processing device, characterised in that the control device is designed to control a supply device for a processing means...

Claim ~~17~~, 18 ~~and 25~~ is deemed an independent claim.

The dependency of claim 9 on claim 1a or of claims 21, 22, 23 or 24 on claim 18a was not taken into consideration because the "processing means" or the "supply device" to which claims 9 and claims 21, 22, 23 and 24 relate was not defined.

DE-C-3923356 (D1) is the closest prior art.

D1 discloses a:

Method for producing a cavity (see column 1, line 10) in

## Supplemental Box

a workpiece, in which a laser beam is used to remove material (see claim 1), wherein the side walls of the cavity are processed using a laser beam (see column 2, lines 9-15, column 4, lines 8-17).

D1 therefore discloses all the features of claim 1.

D1 also discloses the features of claims 2, 6, 8, 18a, 19 and 20.

Invention 1:

From a comparison of the published prior art with the features of claims 1a + 3, the following features (special technical features) (PCT Rule 13.2) can be deemed as making a contribution over the prior art:

"The side walls are processed after a plurality of layers have been removed without the side walls being processed."

The following objective problem can be derived therefrom:

"Obtaining a smoother side surface".

Invention 2:

From a comparison of the published prior art with the features of claims 1a + 4, the following special technical features (PCT Rule 13.2) can be deemed as making a contribution over the prior art:

"the side walls are processed with specially adapted

## Supplemental Box

laser radiation."

The following objective problem can be derived therefrom:

"A more efficient removal of the deposits".

Invention 3:

From a comparison of the published prior art with the features of claims 1a + 5 or 1a + 7, the following special technical features (PCT Rule 13.2) can be deemed as making a contribution over the prior art:

"the side walls are processed according to data pertaining to the cavities".

The following objective problem can be derived therefrom:

"the synchronisation of the movement of the laser beam across the side walls with the focussing and/or laser performance".

Invention 4:

From a comparison of the published prior art with the features of claims 1b and 18b, the following special technical features (PCT Rule 13.2) can be deemed as making a contribution over the prior art:

"the side walls are processed with a processing means".

The following objective technical problem can be derived

## Supplemental Box

therefrom:

"Processing the side walls with lower precision of the removing tool".

Invention 5:

From a comparison of the published prior art with the features of claims 1a + 17, or 18a+25, or 18b+25, the following special technical features (PCT Rule 13.2) can be deemed as making a contribution over the prior art:

"the side walls of the cavity are processed with ultrasound:.

The following objective problem can be derived therefrom:

"Cost effective processing of the side walls".

The above analysis shows that it is not clear from amongst the special technical features of the inventions what the technical relationship is that involves one or more of the same or corresponding technical features. The requirements of PCT Rules 13.1 and 13.2 are therefore not met and there is consequently a lack of unity of invention.

Furthermore, the 5 groups of claims are not linked by a single special technical features and therefore define 5 different inventions.

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**Supplemental Box**